

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A process for producing a fibrous material having a modified structure comprising a lignocellulosic matrix with phenolic or similar structural groups which are capable of being oxidized by oxidizing agents and a modifying agent, said process comprising the steps of
 - oxidizing phenolic or similar structural groups of the lignocellulosic matrix to provide an oxidized fibre material, and
 - contacting the oxidized fibre material with a modifying agent containing at least one first functional portion, which is compatible with the oxidized fibre material, said modifying agent being capable of providing the lignocellulosic fibre material with properties foreign to the native fibre.

2. (original): The process according to claim 1, wherein the lignocellulosic fibrous matrix is reacted with an oxidizing agent in the presence of a substance capable of catalyzing the oxidation of phenolic or similar structural groups by said oxidizing agent.

3. (previously presented): The process according to claim 1, wherein the modifying agent is activated with an oxidizing agent.
4. (previously presented): The process according to claim 1, wherein the modifying agent is selected from the group of hydrophobic agents, whitening or (colour retention agents), signal agents, active gas traps, antimicrobial compounds, colouring agents, pigments, agents capable of dissipating incident radiation, sizing agents, retention agents, or an agent carrying several of these properties.
5. (previously presented): A process for producing a fibre material having a modified structure comprising a lignocellulosic fibrous matrix with phenolic or similar structural groups which are capable of being oxidized by oxidizing agents and a modifying agent, said process comprising the steps of
 - oxidizing phenolic or similar structural groups of the lignocellulosic matrix to provide an oxidized fibre material, and
 - contacting the oxidized fibre material with a modifying agent containing at least one first functional portion, which is compatible with the oxidized fibre material, and at least one second portion having new functional properties in order to provide a lignocellulosic fibre material exhibiting properties foreign to the native fibre.

6. (original): The process according to claim 5, wherein the lignocellulosic fibrous matrix is reacted with an oxidizing agent in the presence of a substance capable of catalyzing the oxidation of phenolic or similar structural groups by said oxidizing agent.
7. (original): The process according to claim 5, wherein the modifying agent comprises at least one functional group, which bonds to the oxidized lignocellulosic matrix, and a hydrocarbon tail, which is saturated or unsaturated.
8. (previously presented): The process according to claim 5, wherein the hydrocarbon tail contains a minimum of two carbon atoms.
9. (previously presented): The process according to claim 5, wherein the second portion comprises a group capable of carrying or capable of being modified for carrying a negative or positive charge.
10. (previously presented): The process according to claim 5, wherein the second portion comprises a group capable of carrying or capable of being modified for antibacterial, antifungal or antimicrobial effect.

11. (previously presented): The process according to claim 5, wherein the second portion comprises a group capable of carrying or capable of being modified for heatproof, flame-retardant or UV-resistant.

12. (previously presented): The process according to claim 5, wherein second portion comprises a group capable of carrying or capable of being modified for conductive, antistatic, insulative character or is acting as a sensor.

13. (previously presented): The process according to claim 5, wherein the second portion comprises a group capable of carrying or capable of being modified for changing the colour of the fibre.

14. (previously presented): The process according to claim 5, wherein the second portion comprises properties that participate in developing colour.

15. (previously presented): The process according to claim 5, wherein the modifying agent is selected from the group of betuline, betulinol, kaempferol and quercetin.

16. (previously presented): A process for producing a fibre material having a modified structure comprising a lignocellulose fibrous matrix having phenolic or similar structural groups

which are capable of being oxidized by oxidizing agents and a modifying agent, said process comprising the steps of

- oxidizing phenolic groups of the lignocellulosic matrix to provide an oxidized fibre material,
- contacting the oxidized fibre material with a modifying agent containing at least one first functional group, which is compatible with the oxidized fibre material, and at least one second functional group in order to provide a lignocellulosic fibre material having a modified surface,
- contacting the lignocellulosic fibre material with a functional agent, and
- bonding a functional agent to the modified surface of the fibre material in order to impart to the fibre material new functional properties, foreign to the native fibre, derivable from the functional agent.

17. (original): The process according to claim 16, wherein the lignocellulosic fibrous matrix is reacted with an oxidizing agent in the presence of a substance capable of catalyzing the oxidation of phenolic or similar structural groups by said oxidizing agent.

18. (previously presented): The process according to claim 17, wherein the modifying compound is a bifunctional compound containing at least one first functional portion or group and at least one second functional group, the second functional group being selected

from the group consisting of hydroxyl (including phenolic hydroxy groups), carboxy, anhydride, aldehyde, ketone, amino, amine, amide, imine, imidine and derivatives and salts thereof.

19. (previously presented): The process according to claim 1, wherein the substance capable of catalyzing the oxidation of phenolic groups is an enzyme.

20. (previously presented): The process according to claim 19, wherein the enzyme capable of catalyzing the oxidation of phenolic or similar structural groups is selected from the group consisting of peroxidases and oxidases.

21. (previously presented): The process according to claim 20, wherein the enzyme is selected from the group consisting of laccases (EC 1.10.3.2), catechol oxidases (EC 1.10.3.1), tyrosinases (EC 1.14.18.1), bilirubin oxidases (EC 1.3.3.5), horseradish peroxidase (EC 1.11.1.7), manganese peroxidase (EC 1.11.1.13), lignin peroxidase (EC 1.11.1.14), hexose oxidase (EC 1.1.3.5), galactose oxidase (EC 1.1.3.9) and lipoxygenase (EC 1.13.11.12).

22. (previously presented): The process according to claim 20, wherein the enzyme dosage is from 1 to 100,000 nkat/g, and it is employed in an amount of 0.0001 to 10 mg protein/g of dry matter.

23. (previously presented): The process according to claim 1, wherein the oxidizing agent is selected from the group consisting of oxygen and oxygen-containing gases.

24. (previously presented): The process according to claim 23, wherein the oxygen or oxygen-containing gas is introduced into the aqueous slurry during the reaction.

25. (previously presented): The process according to claim 1, wherein the reaction of step (a) is carried out in an aqueous or dry phase at a consistency of 1 to 95 % by weight of the fibre material.

26. (previously presented): The process according to claim 1, wherein the reaction is carried out at temperature 5 – 100 °C.

27. (previously presented): The process according to claim 1, wherein the reaction is carried out on a fibrous web.

28. (original): The process according to claim 1, wherein the lignocellulosic fibre material is reacted with a chemical oxidizing agent capable of catalyzing the oxidation of phenolic or similar structural groups to provide an oxidized fibre material.

29. (previously presented): The process according to claim 1, wherein the chemical oxidizing agent is hydrogen peroxide, Fenton reagent, organic peroxidase, potassium permanganate, ozone and chloride dioxide, ammoniumpersulphate (APS) or an inorganic transition metal salt.

30. (previously presented): The process according to claim 1, wherein radical forming radiation capable of catalyzing the oxidation of phenolic or similar structural groups is used to provide an oxidized fibre material.

31. (previously presented): The process according to claim 1, wherein the reaction steps are carried out sequentially or simultaneously.

32. (previously presented): A method of producing white-coloured fibres from a raw-material comprising a lignocellulosic fibrous matrix, the method comprising the steps of

- oxidizing phenolic or similar structural groups of the lignocellulosic matrix to provide an oxidized fibre material, and
- contacting the oxidized fibre material with a whitening agent containing at least one first functional portion, which is compatible with the oxidized fibre material.

33. (previously presented): The method according to claim 32, wherein the whitening agent is an organic substance.

34. (previously presented): The method according to claim 32, wherein the whitening is selected from betuline, betulinol, kaempferol and quercetin.

35. (previously presented): The process according to claim 8, wherein the hydrocarbon tail contains at least three carbon atoms.

36. (previously presented): The process according to claim 8, wherein the hydrocarbon tail contains 2 to 30 carbon atoms.

37. (previously presented): The process according to claim 8, wherein the hydrocarbon tail contains 3 to 30 carbon atoms.

38. (previously presented): The process according to claim 8, wherein the hydrocarbon tail contains 2 to 24 carbon atoms.

39. (previously presented): The process according to claim 8, wherein the hydrocarbon tail contains 3 to 24 carbon atoms.

40. (previously presented): The process according to claim 22, wherein the enzyme dosing is from 10-500 nkat/g.

41. (previously presented): The process according to claim 23, wherein the oxygen-containing gases comprise air or hydrogen peroxide.

42. (new): The process according to claim 1, wherein the chemical oxidizing agent is a salt.